AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows.

Claims 1-105. (Canceled)

106. (new) An isolated recombinant protein comprising a variant form of SEQ ID NO:38, said variant form having no more than 29 amino acids other than position 214 of SEQ ID NO:38 which are different from the amino acids described in SEQ ID NO:38, wherein the recombinant protein has luciferase activity and increased thermostability as compared to wild-type *Photinus pyralis* luciferase.

107. (new) The recombinant protein of claim 106, wherein Xaa in SEQ ID NO:38 is an amino acid selected from the group consisting of Cys, Ala and Asp.

108. (new) The recombinant protein of claim 106, wherein Xaa in SEQ ID NO:38 is Ala.

109. (new) The recombinant protein of claim 106, wherein the recombinant protein comprises a variant form of SEQ ID NO:40 wherein said variant form comprises no more than 28 amino acids other than positions 214 and 354 of SEQ ID NO:40 which are different from the amino acids described in SEQ ID NO:40.

110. (new) The recombinant protein of claim 106, wherein the recombinant protein comprises a variant form of SEQ ID NO:41 wherein said variant form comprises no more than 27 amino acids other than positions 214, 232 and 354 of SEQ ID NO:41 which are different from the amino acids described in SEQ ID NO:41.

111. (new) The recombinant protein of claim 106, wherein the recombinant protein comprises a variant form of SEQ ID NO:42 wherein said variant form comprises

no more than 26 amino acids other than positions 214, 215, 232 and 354 of SEQ ID NO:42 which are different from the amino acids described in SEQ ID NO:42.

112. (new) An isolated nucleic acid sequence which encodes the recombinant protein according to claim 106.

113. (new) A vector comprising the nucleic acid sequence according to claim 112.

114. (new) An isolated cell transformed with the vector according to claim 113.

115. (new) The cell according to claim 114 which is a prokaryotic cell.

116. (new) The cell according to claim 114 which is a plant cell.

117. (new) A plant comprising the cell according to claim 116.

118. (new) In a bioluminescent assay which comprises a luciferase/luciferin reaction and detection of bioluminescence, the improvement comprising contacting the recombinant protein according to claim 106 in said reaction compared with contacting the corresponding wild-type luciferase in said reaction.

119. (new) A kit comprising the protein according to claim 106.

120. (new) The kit according to claim 119 which further comprises luciferin.

121. (new) An isolated recombinant protein comprising SEQ ID NO:38, wherein the recombinant protein has luciferase activity and increased thermostability as compared to wild-type *Photinus pyralis* luciferase.

122. (new) The recombinant protein of claim 121, wherein Xaa in SEQ ID NO:38 is an amino acid selected from the group consisting of Cys, Ala and Asp.

123. (new) The recombinant protein of claim 121, wherein Xaa in SEQ ID NO:38 is Ala.

124. (new) An isolated recombinant protein comprising SEQ ID NO:40, wherein the recombinant protein has luciferase activity and increased thermostability as compared to wild-type *Photinus pyralis* luciferase.

125. (new) An isolated recombinant protein comprising SEQ ID NO:41, wherein the recombinant protein has luciferase activity and increased thermostability as compared to wild-type *Photinus pyralis* luciferase.

126. (new) An isolated recombinant protein comprising SEQ ID NO:42, wherein the recombinant protein has luciferase activity and increased thermostability as compared to wild-type *Photinus pyralis* luciferase.

127. (new) An isolated nucleic acid sequence which encodes the recombinant protein according to claim 121.

128. (new) An isolated nucleic acid sequence which encodes the recombinant protein according to claim 124.

129. (new) An isolated nucleic acid sequence which encodes the recombinant protein according to claim 125.

130. (new) An isolated nucleic acid sequence which encodes the recombinant protein according to claim 126.

131. (new) A vector comprising the nucleic acid sequence according to claim 127.

132. (new) A vector comprising the nucleic acid sequence according to claim 128.

133. (new) A vector comprising the nucleic acid sequence according to claim 129.

134. (new) A vector comprising the nucleic acid sequence according to claim 130.

135. (new) An isolated cell transformed with the vector according to claim 131.

136. (new) An isolated cell transformed with the vector according to claim 132.

137. (new) An isolated cell transformed with the vector according to claim 133.

138. (new) An isolated cell transformed with the vector according to claim 134.

139. (new) The cell according to claim 135 which is a prokaryotic cell.

140. (new) The cell according to claim 136 which is a prokaryotic cell.

141. (new) The cell according to claim 137 which is a prokaryotic cell.

142. (new) The cell according to claim 138 which is a prokaryotic cell.

143. (new) The cell according to claim 135 which is a plant cell.

144. (new) The cell according to claim 136 which is a plant cell.

145. (new) The cell according to claim 137 which is a plant cell.

146. (new) The cell according to claim 138 which is a plant cell.

147. (new) A plant comprising the cell according to claim 143.

148. (new) A plant comprising the cell according to claim 144.

149. (new) A plant comprising the cell according to claim 145.

150. (new) A plant comprising the cell according to claim 146.

151. (new) In a bioluminescent assay which comprises a luciferase/luciferin reaction and detection of bioluminescence, the improvement comprising contacting the recombinant protein according to claim 121 in said reaction compared with contacting the corresponding wild-type luciferase in said reaction.

152 . (new) In a bioluminescent assay which comprises a luciferase/luciferin reaction and detection of bioluminescence, the improvement comprising contacting the recombinant protein according to claim 124 in said reaction compared with contacting the corresponding wild-type luciferase in said reaction.

153. (new) In a bioluminescent assay which comprises a luciferase/luciferin reaction and detection of bioluminescence, the improvement comprising contacting the recombinant protein according to claim 125 in said reaction compared with contacting the corresponding wild-type luciferase in said reaction.

154. (new) In a bioluminescent assay which comprises a luciferase/luciferin reaction and detection of bioluminescence, the improvement comprising contacting the recombinant protein according to claim 126 in said reaction compared with contacting the corresponding wild-type luciferase in said reaction.

155. (new) A kit comprising the protein according to claim 121.

156. (new) A kit comprising the protein according to claim 124.

157. (new) A kit comprising the protein according to claim 125.

158. (new) A kit comprising the protein according to claim 126.

159. (new) The kit according to claim 155 which further comprises luciferin.

160. (new) The kit according to claim 156 which further comprises luciferin.

161. (new) The kit according to claim 157 which further comprises luciferin.

162. (new) The kit according to claim 158 which further comprises luciferin.